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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/821,135  
Filing Date: April 08, 2004  
Appellant(s): COLLINS ET AL.

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Christopher P. Kosh  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 12/04/2008 appealing from the Office action mailed 8/21/2008.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

<b>7109981</b>	<b>Damera-Venkata</b>	<b>4-2004</b>
<b>7301549</b>	<b>Damera-Venkata</b>	<b>10-2003</b>
<b>6384816</b>	<b>Tabata</b>	<b>11-1999</b>
<b>2003/0020809</b>	<b>Gibbon</b>	<b>1-2003</b>
<b>6304245</b>	<b>Groenenboom</b>	<b>9-1998</b>

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

1. Claim 1 is rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of U.S. Patent No. **7,109,981** (Damera-

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Venkata) in view of U.S. Pub. 2003/0020809 (Gibbon). Damera-Venkata teaches every limitation of claim one except “wherein each of the second set of pixels is centered relative to one of the first set of pixels.” However, Gibbon teaches “the two resulting sub-images are offset by one half of a pixel in both horizontal and vertical directions” ([0012]).

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to modify Damera-Venkata to include the use of a second set of pixels that are centered relative to one of the first set of pixels as taught by Gibbon in order to allow “the two sub-images to combine to produce a final image having a greater resolution than that provided by the actual pixels” as stated in ([0012], of Gibbon).

2. Claim 1 is rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of U.S. Patent No. **7,301,549** (Damera-Venkata) in view of U.S. Pub. 2003/0020809 (Gibbon). Damera-Venkata teaches every limitation of claim one except “wherein each of the second set of pixels is centered relative to one of the first set of pixels.” However, Gibbon teaches “the two resulting sub-images are offset by one half of a pixel in both horizontal and vertical directions” ([0012]).

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to modify Damera-Venkata to include the use of a second set of pixels that are centered relative to one of the first set of pixels as taught by Gibbon in order to allow

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“the two sub-images to combine to produce a final image having a greater resolution than that provided by the actual pixels” as stated in ([0012], of Gibbon).

***Claim Rejections - 35 USC § 103***

3. Claims 1, 2, 13, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tabata et al (6,384,816) hereinafter, Tabata.

4. In regards to claim 1, Tabata discloses the limitations of a method of displaying an image with a display device, the method comprising: receiving image data for the image, the image data comprising a first set of pixels; generating first and second sub-frames (abstract), wherein the first and the second sub-frames comprise a second set of pixels (col. 2, lines 14-61), alternating between displaying the first sub-frame in a first position and displaying the second sub-frame in a second position spatially offset from the first position (“a first pixel position serving as standard; a second pixel position shifted with respect to the first, standard pixel position horizontally approximately by 1/2 of horizontal pixel pitch; a third pixel position shifted horizontally approximately by 3/4 or 1/4 of horizontal pixel pitch and vertically approximately by 1/2 of vertical pixel pitch; and a fourth pixel position shifted horizontally approximately by 1/4 or 3/4 of horizontal pixel pitch and vertically approximately by 1/2 of vertical pixel pitch” abstract and fig. 14 and fig. 15 (1,2,3,4)).

Tabata differs from the claimed invention in that Tabata does not expressly disclose wherein each of the second set of pixels is centered relative to a respective one of the first set of pixels.

However, Gibbon teaches a system and method for a set of pixels centered relative to a respective one of another set of pixels (fig. 6, and fig. 10 [0012]). Examiner notes that Gibbons teaches the centered special relationship between two sub-images.

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to modify Tabata to include the use of a set of centered pixels as taught by Gibbon in order to provide a means to superimpose an image in order to produce a high resolution image as stated in ([0010-0012] of Gibbon).

5. In regards to claim 13, Tabata discloses the limitations of a system for displaying an image, the system comprising:

a buffer adapted to receive image data for the image, the image data comprising a first set of pixels (fig. 12 (21) and (22));

an image processing unit configured to define first, second, third, and fourth sub-frames comprising a second set of pixels (fig. 8 (5)).

Tabata differs from the claimed invention in that Tabata does not expressly disclose wherein each of the second set of pixels is centered relative to a respective one of the first set of pixels.

However, Gibbon teaches a system and method for a set of pixels centered relative to a respective one of another set of pixels (fig. 6, and fig. 10 [0012]). Examiner notes that Gibbons teaches the centered special relationship between two sub-images.

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to modify Tabata to include the use of a set of centered pixels as taught by Gibbon in order to provide a means to superimpose an image in order to produce a high resolution image as stated in ([0010-0012] of Gibbon).

Therefore, Tabata as modified by Gibbon teaches a display device adapted to alternately display the first sub-frame in the first position, displaying the second sub-frame in the second position spatially offset from the first position ((col. 8, lines 1-12) Tabata), displaying the third sub-frame in a third position spatially offset from the first position and the second position (fig. 5A (3) Tabata), and displaying the fourth sub-frame in a fourth position spatially offset from the first position (fig. 5B (4) Tabata), the second position, and the third position (fig. 5A and 5B (1,2,3,4) Tabata).

6. In regards to claim 20, Tabata discloses the limitations of a system for generating first, second, third, and fourth sub- frames (col. 2, lines 22-63) for display at spatially offset positions to generate the appearance of an image (col. 2, lines 22-63), the system comprising:

means for receiving image data corresponding to the image (fig. 8 video signal);  
means for generating the first, the second, the third, and the fourth sub-frames using the image data (col. 2, lines 22-63), each of the first, second, third, and fourth sub-frames



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comprising a plurality of sub-frame pixel values that correspond to a plurality of sub-frame pixels(col. 2, lines 22-63), and

means for calculating a plurality of simulated image pixel (col. 2, lines 22-63) values for a simulated image by convolving each of the sub-frame pixel values with at least four other sub-frame pixel values (fig. 9 3-1,3-2,3-3.3-4 and 3-5); Examiner notes that the sub-frames are convolved by viewing over a period of time and

means for updating the first, the second, the second, the third, and the fourth sub- frames in accordance with a difference between the simulated image and the image data (col. 5, lines 59-67 turning off and on an applied voltage).

Tabata differs from the claimed invention in that Tabata does not disclose wherein each of the plurality of sub-frame pixels are centered with respect to a respective one of a plurality of pixels of the image data.

However, Gibbon teaches a system and method for a set of pixels centered relative to a respective one of another set of pixels (fig. 6, and fig. 10 [0012]). Examiner notes that Gibbons teaches the centered special relationship between two sub-images.

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to modify Tabata to include the use of a set of centered pixels as taught by Gibbon in order to provide a means to superimpose an image in order to produce a high resolution image as stated in ([0010-0012] of Gibbon).

7. In regards to claim 2, Tabata as modified by Gibbon teaches generating third and fourth sub-frames, wherein the third and the fourth sub-frames comprise the second set

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of pixels (fig. 14 and 15 (1,2,3 and 4) and (3-1,3-2,3-4,3-6,3-6) Tabata), wherein each of the second set of pixels is centered relative to one of the first set of pixels (fig. 6, and fig. 10 [0012] Gibbon); and alternating between displaying the first sub-frame in the first position, displaying the second sub-frame in the second position spatially offset from the first position ((col. 8, lines 1-12) Tabata), displaying the third sub-frame in a third position spatially offset from the first position and the second position (fig. 5A (3) Tabata), and displaying the fourth sub-frame in a fourth position spatially offset from the first position (fig. 5B (4) Tabata), the second position, and the third position (fig. 5A and 5B (1,2,3,4) Tabata).

8. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tabata in view of Gibbon, further in view of Groenenboom et. al (US PUB 6,304,245) hereinafter, Groenenboom.

9. In regards to claim 14, Gibbon discloses the limitations of claim 13 Tabata and Gibbon differs from the claimed invention in that Tabata and Gibbon do not disclose wherein the first set of pixels comprises a plurality of pixels at a first resolution, and wherein the second set of pixels comprises a plurality of pixels at a second resolution less than the first resolution.

However, Groenenboom teaches a system and method for "wherein the first set of pixels (foreground) comprises a plurality of pixels at a first resolution ("having

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different resolution"), and wherein the second set of pixels comprises a plurality of pixels (background) at a second resolution less than the first resolution "(abstract, fig. 5 col. 3-4, lines 6-25 of Groenenboom).

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to modify Tabata and Gibbon to include the use of mixing a foreground picture and a background picture as taught by Groenenboom in order to mix differing resolutions with out yielding visible artifacts as stated in (col. 1, lines 5-15 of Groenenboom).

#### **(10) Response to Argument**

As to claims 1-2, 13,14, and 20 applicant argues that the teachings describes a relationship between "the two resulting sub-images" of Gibbon, the teachings does not describe the spatial relationship (i.e. centered) between pixels of "the two resulting sub-images" and pixels of the image data from which the "two resulting sub-images were created". However, examiner respectfully submits the "two resulting sub-images" fairly suggest the claimed invention for the reason disused in the rejection above.

Furthermore, as the present invention's ability to enhance the display of various types of graphical images, examiner respectfully submits the claims are absent any specific claim language that would differentiate over the prior art made of record.

#### **I. Rejection of Claim 1 on the Grounds of Nonstatutory Double Patenting.**

**B. Rejection of Claim 1 on the Ground of Nonstatutory Double Patenting over claim 1 of U.S. Patent No. 7,109,981 (Damera-Venkata '981) in view of U.S. Patent Publication No. 2003/0020809 (Gibbon) .**

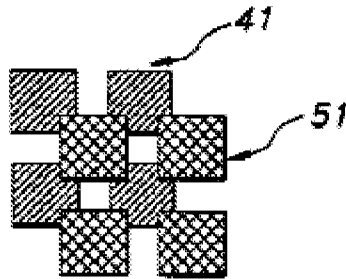
In response to Applicant's argument (Section I(B)) that Gibbon teaches describing a relationship between "the two resulting sub-images". The teaching does not, however, describe, the spatial relationship between pixels of "the two resulting sub-images" and pixels of the image data from which the "the two resulting sub-images were created" (Appeal Brief, page 11, second paragraph). Examiner respectfully disagrees.

The examiner has acknowledged in the previous Office Action that Damera-Venkata '981 does not explicitly disclose "wherein each of the second set of pixels is **centered** relative to a respective one of the first set of pixels" as recited in claim 1. As a result the examiner relied upon Gibbons, which teaches "the two resulting sub-images **are offset by one half of a pixel in both horizontal and vertical directions**, allowing the two sub-images to combine to produce a final image having a greater resolution than that provided by the actual pixels..." [0012]

Furthermore, Applicant states, Appellant has been unable to find any teachings or suggestion of "centered resulting sub-images" of Gibbon as asserted by the Examiner. However, examiner believes Applicant is attempting to read limitations from the specification into the claim language. Particularly in regards to what constitutes "centered". Gibbon states, "the two resulting sub-images are offset by one half of a pixel in both horizontal and vertical directions, allowing the two sub-images to combine to produce a final image having a greater resolution than that provided by the actual pixels..." [0012]. Examiner points to the fact that the edges of the pixel will be centered relative to the respective pixel of the corresponding sub-frame group, i.e. as illustrated

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in fig. 6 below. sub-images (51) will be offset from sub-image (41) by one half a pixel in both horizontal and vertical direction, i.e. center of pixel.

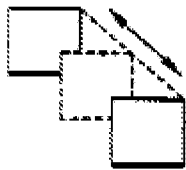
**FIG 6**

Applicant goes on to state that the teaching regarding Gibbon describes a relationship between “the two resulting sub-images” of Gibbon. The teaching does not describe the spatial relationship between pixels of “the two resulting sub-images” and pixels of the image data from which “the two resulting sub-images” were created.

However, examiner respectfully submits that the claims are absent any specific language that would differentiate over the prior art made of record. But, Claim 1 merely states inter alia: “receiving image data for the image, the image data comprising a first set of pixels; generating first and second sub-frames, wherein the first and the second sub-frames comprise a second set of pixels...” Image data by definition comprises pixels. The entire image data and all its pixels, is a frame. Dividing the frame into one of two or more equal parts comprises a field, also known as a sub-frame.

For example, from fig. 6 above, (41) and (51) are both a field, or sub-frame. (41) and (51) also comprise pixels, all of which encompass image data.

Therefore, when Applicant states, "the plain teachings of Gibbon above states that the two resulting sub-images are offset from one another and in no way suggest that either the sub-images are centered with respect to one another or with respect to the image data" (Appeal Brief, page 11, lines 19-23). Examiner respectfully disagrees for the reasons set forth in the previous Office Action and stated above.



**FIG 10**

Fig. 10 above shows the possible motion paths for moving the pixels [0040]. The first and second positions of the pixels are such that the two resulting sub-images are offset by one half a pixel in both horizontal and vertical direction, allowing the two sub-images to combine to produce a final image having a greater resolution than that provided by the actual pixels [0012]. Fig. 10 better illustrates how one pixel's edge

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would be “centered” relative to another pixel. And as shown in fig. 6 made up of fields or subframe (41 and 51). All of which encompass image data.

**C. Rejection of Claim 1 on the Ground of Nonstatutory Double Patenting over claim 1 of U.S. Patent No. 7,301,549 (Damera-Venkata '549) in view of U.S. Patent Publication No. 2003/0020809 (Gibbon)**

The examiner has acknowledged in the previous Office Action that Damera-Venkata '549 does not explicitly disclose “wherein each of the second set of pixels is centered relative to a respective one of the first set of pixels” as recited in claim 1. As a result the examiner relied upon Gibbons, which teaches “the two resulting sub-images are offset by one half of a pixel in both horizontal and vertical directions, allowing the two sub-images to combine to produce a final image having a greater resolution than that provided by the actual pixels...” [0012].

However, Gibbon cures any deficiencies for the reason set forth in the previous Office Action and elaborated upon above.

**II. Rejection of Claims 1,2,13, 14, and 20 under 35 U.S.C § 103**

**B. Rejection of Claims 1, 2, 13, and 20 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,384,816 (Tabata) in view of U.S. Patent Publication No. 2003/0020809 (Gibbon)**

**1. Rejection of Claims 1 and 2 under 35 U.S.C. §103(a) as being unpatentable over Tabata in view of Gibbon**

In response to Applicant's argument that neither this teaching of Tabata nor the remainder of the Abstract teach or suggest the generation of sub-frames. Examiner respectfully disagrees. Tabata is an image display apparatus including a delta-array display device and pixel position transition means (Abstract). Fig. 1 (Prior Art) of Tabata shows a pixel array using a delta-array. But more importantly, Fig. 2 (Prior Art) shows the shifted pixel position and the conventional 4-point pixel shifting system. The 4-point pixel shifting system, which Tabata uses, utilizes fields (also known as sub-frames).

"A 4-point pixel shift is effected by causing an image to shift horizontally by 1/2 pixel pitch through one set of the polarizing direction control liquid crystal panel and quartz plate and causing the image to shift vertically by 1/2 pixel pitch through the other set of polarizing direction control liquid crystal panel and quartz plate. In other words, one frame is composed of four fields with dividing image signals into four images, and each divided image is stored to a frame memory. These are then synthesized as displayed at respective positions by allowing a straight propagation through the two sets of liquid crystal panels for a first field, by shifting horizontally by 1/2 pixel pitch for a second field, by shifting vertically by 1/2 pixel pitch for a third field, and by shifting 1/2 pixel pitch both horizontally and vertically for a fourth field. A high-definition image based on the 4-point pixel shift is thereby displayed ." (col. 1, lines 20-35).

Applicant also contends that Tabata fails to teach or suggest "wherein each of the second set of pixels is centered relative to a respective one of the first set of pixels." (Remarks, page 14, lines 8-11).

However, as stated above Gibbon teaches wherein each of the second set of pixels is centered relative to a respective one of the first set of pixels. (fig. 6 and 10 and paragraph [0012]).

Applicant also asserts that the cited teachings of Gibbon do not describe the spatial relationship between the pixels of the sub-images and the pixels of the image



data from which the sub-images were created (Appeal Brief, page 14, lines 1-25).

However, Examiner respectfully disagrees. Image data comprises sub-frames and pixels. Applicant it appears is trying to draw a distinction between spatial relation of the sub-images and the pixels of the image data from which the sub-images were created but, Tabata teaches "a first pixel position serving as the standard" (Abstract) (fig. 4 "(1)" and corresponding white pixels). But, as discussed above all pixels encompass image data.

## **2. Rejection of Claim 13 under 35 U.S.C. §103(a) as being unpatentable over Tabata in view of Gibbon**

In response to Applicant's arguments that neither Tabata nor Gibbon teach or suggest "an image processing unit configured to define first, second , third and fourth sub-frames on a respective one of the first set of pixels. Examiner respectfully disagrees.

As shown above, Tabata teaches using a 4-point pixels shift which consists of dividing a frame into fields or sub-frames (col.1, lines 20-35). The examiner cites fig. 8 (5) of Tabata, which is a "video signal processing circuit" for "controlling video signals in accordance with pixel shift control" (col. 5, lines 30-35), to correspond to Applicant's "image processing unit". The "video signal processing circuit" of Tabata is configured to define sub-frames or fields as explained in The Background of Tabata (col. 1, lines 20-35) i.e., the 4-point pixel shift and explained above.

Also, Applicant asserts that Tabata and Gibbon fails to teach or suggest wherein each of the second set of pixels is centered on a respective one of the first set of pixels.

However, as stated above Gibbon teaches wherein each of the second set of pixels is centered relative to a respective one of the first set of pixels. (fig. 6 and 10 and paragraph [0012]).

Applicant asserts that claim 13 recites a relationship between the sub-frame pixels and the image data pixel. And states claim 1 (examiner assumes applicant intended claim 13) recites that each of the second set of pixels is centered on a respective one of the first set of pixels. However, as discussed above image data by definition comprises pixels. The entire image data and all its pixels, is a frame. Dividing the frame into one of two or more equal parts comprises a field, also know as a sub-frame. Applicant is trying to infer more of a relationship than what is claimed. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

### **3. Rejection of Claim 20 under 35 U.S.C. §103(a) as being unpatentable over Tabata in view of Gibbon**

In response to applicant remarks that neither Tabata nor Gibbon teach or suggest “means for generating the first, the second, the third and the fourth sub-frames using the image data each of the first, second, third, and fourth sub-frames comprising a plurality of sub-frame pixels values that correspond to a plurality of sub-frames pixels wherein each of the plurality of sub-frame pixels are centered with respect to a respective on of a plurality of pixels of the image data”. Examiner respectfully disagrees.

Applicant contends that col. 2, lines 22-63 of Tabata does not teach or suggest the generation of sub-frames. However, Examiner respectfully disagrees. As mentioned above Tabata discusses using 4-point pixel shift which dividends a frame into four fields, or sub-frame (see background of Tabata for explanation col. 1, lines 15-45). Applicant also contends that Tabata does not teach or suggest "wherein each of the plurality of sub-frame pixels are centered with respect to one of a plurality of pixels of the image data." The examiner has acknowledged in the previous Office Action that Tabata does not explicitly disclose "wherein each of the plurality of sub-frame pixels are centered with respect to one of a plurality of pixels of the image data." as recited in claim 20. As a result the examiner relied upon Gibbons, which teaches "the two resulting sub-images **are offset by one half of a pixel in both horizontal and vertical directions**, allowing the two sub-images to combine to produce a final image having a greater resolution than that provided by the actual pixels..." [0012].

As stated above Gibbon teaches wherein each of the second set of pixels is centered relative to a respective one of the first set of pixels. (fig. 6 and 10 and paragraph [0012]).

Applicant also asserts that Gibbon does not describe a relationship between the pixels of the sub-images and the pixels of the image data from which the sub-images were created. Examiner respectfully submits that the claims are absent any specific language that would differentiate over the prior art made of record. But, Claim 20 merely states inter alia:, "comprising a plurality of sub-frame pixels values that **correspond** to a plurality of sub-frame pixels wherein each of the plurality of sub-frame pixels are

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centered with respect to a respective one of a plurality of pixels of the image data...”

(emphasis added) Image data by definition comprises pixels. The entire image data and all its pixels, is a frame. Dividing the frame into one of two or more equal parts comprises a field, also known as a sub-frame.

**C. Rejection of Claim 14 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,384,816 (Tabata) in view of U.S. Patent Publication No. 2003/0020809 (Gibbon) in further view of U.S. Patent No. 6,304,245 (Groenenboom)**

Claim 14 depends from claim 13, Groenenboom is cited as a teaching of the features of Claim 14 and is maintained for the reasons stated in claim 13.

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Grant D Sitta/  
Examiner, Art Unit 2629  
February 23, 2009

Conferees:

/Sumati Lefkowitz/

Supervisory Patent Examiner, Art Unit 2629

/Amr Awad/

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Supervisory Patent Examiner, Art Unit 2629